RECEIVED
CENTRAL FAX CENTER
JUL 2 6 2006

In the claims

1. (currently amended) A system for providing a signal to an actuator within an optical disk drive, to focus optics on a disk within the optical disk drive, wherein the system comprises:

a SUM table within which to record SUM signal data, the SUM signal data representing a summation of values from a plurality of focus sensors, and is different than a focus error signal (FES) representing a difference between a sum of the values from a first subset of the focus sensors and a sum of the values from a second subset of the focus sensors;

an error term generator to process the SUM signal data from the SUM table to produce an error term; and

an actuator control signal generator to generate an actuator control signal, wherein the actuator control signal is a function of a prior actuator position, the error term and an adaptation coefficient, wherein the adaptation coefficient is configured to regulate a rate at which the error term is allowed to modify the prior actuator position.

2. (original) The system of claim 1, wherein the SUM table is configured to be updated prior to application of an image to an annular portion of the disk.

3. (original) The system of claim 1, wherein the SUM table is configured to include summations of sampled SUM data associated with both actuator movement from a baseline toward the disk and away from the disk.

4. (original) The system of claim 1, wherein each entry within the SUM table is associated with a sector of the disk and a direction of actuator movement.

5. (original) The system of claim 1, wherein the SUM table is configured to include data obtained while moving an actuator in a first direction during a first disk revolution and data obtained while moving the actuator in a second direction during a second disk revolution.

6. (original) The system of claim 1, wherein error term data is included within the SUM table for each sector, and comprises a difference between SUM signal data associated with actuator movement away from the disk and SUM signal data associated with actuator movement toward the disk.

7. (original) The system of claim 1, wherein the error term generator is configured to calculate, for each sector, a difference of SUM signal data associated with actuator movement away from the disk and SUM signal data associated with actuator movement toward the disk.

8. (original) The system of claim 1, wherein the error term generator is configured to calculate the error term for every sector of the disk.

9. (original) The system of claim 1, wherein the actuator control signal generator additionally comprises:

a coefficient generator to generate coefficients as a function of inputs comprising the adaptation coefficient and the error term; and

a Fourier subroutine to generate the actuator control signal using the coefficients generated.

10. (currently amended) The system of claim 1, wherein the actuator control signal generator additionally comprises:

a coefficient generator configured to generate coefficients comprising:

A0 = A0 + (DC0 * Ek * Mu);

A1 = A1 + (QS1 * Ek * Mu);

B1 = B1 + (QC1 * Ek * Mu);

A2 = A2 + (QS2 * Ek * Mu); and

B2 = B2 + (QC2 * Ek * Mu);

wherein Ek is the error term; ~~and~~ Mu is the adaptation coefficient; A0, A1, A2, B1, and B2 are the coefficients generated by the coefficient generator; QS1, QS2, QC1, and QS2 are sinusoidal or cosinusoidal terms; and, DC0 is a nominal voltage level; and

a Fourier subroutine configured to generate the actuator control signal using the coefficients generated.

11. (currently amended) The system of claim 1, wherein the actuator control signal generator is configured to generate a control signal according to Wk(new) = Wk(old) – (Mu * Ek), where Wk is the control signal, Ek is an error term and Mu is an adaptation coefficient.

12. (original) The system of claim 1, wherein the actuator control signal generator is configured, if an angular disk speed of the optical disk drive is sufficiently high, to shift a phase of terms within the actuator control signal to improve convergence of coefficient generation.

13. (original) The system of claim 1, additionally comprising a baseline actuator positioning routine to set a baseline voltage level.

14. (original) The system of claim 13, wherein the baseline voltage level has an AC component which varies as a function of disk angular orientation.

15. (original) The system of claim 1, additionally comprising a baseline actuator positioning routine, to establish a baseline signal for application to an actuator, wherein the baseline actuator positioning routine is configured to:

step an actuator through a full range of focus;

record a maximum value of the SUM signal data obtained within the full range of focus; and

set the baseline signal according to an input to the actuator which resulted in close to the maximum value of the SUM signal data.

16. (currently amended) A processor-readable medium comprising processor-executable instructions for focusing optics on a disk within an optical disk drive, the processor-executable instructions comprising instructions for:

writing data to a SUM table, wherein the data is grouped according to disk sector and according to movement of an actuator toward and away from the disk, the data written to the SUM table representing a summation of values from a plurality of focus sensors, and is different than a focus error signal (FES) representing a difference between a sum of the values from a first subset of the focus sensors and a sum of the values from a second subset of the focus sensors;

generating an error term using data from the SUM table; and

generating an actuator control signal as a function of a prior actuator position, the error term and an adaptation coefficient used to impact a rate at which the actuator control signal varies.

17. (original) A processor-readable medium as recited in claim 16, comprising instructions updating the SUM table prior to application of an image on an annular portion of the disk.

18. (original) A processor-readable medium as recited in claim 16, wherein writing data to the SUM table comprises instructions for:

obtaining and writing data to the SUM table while moving the actuator in a first direction from a baseline position through a portion of each sector of the disk during a first revolution; and

obtaining and writing data to the SUM table while moving the actuator in a second direction from the baseline position through a portion of each sector of the disk during a second revolution.

19. (original) A processor-readable medium as recited in claim 16, comprising instructions for updating the SUM table with data from the SUM signal prior to application of an image to an annular portion of the disk.

20. (original) A processor-readable medium as recited in claim 16, wherein generating the error term comprises instructions for selecting a number of sectors to be defined on the disk.

21. (original) A processor-readable medium as recited in claim 16, wherein generating the error term comprises instructions for generating an error term for each sector of the disk by calculating a difference between data from the SUM table associated with focusing optics being moved closer to the disk and data from the SUM table associated with the focusing optics being moved further from the disk.

22. (original) A processor-readable medium as recited in claim 16, comprising instructions for updating the SUM table prior to application of an image to an annular portion of the disk.

23. (original) A processor-readable medium as recited in claim 16, wherein generating the actuator control signal comprises instructions for:

generating coefficients as a function of inputs comprising the adaptation coefficient and the error term; and

calculating a Fourier series to generate the actuator control signal using the coefficients generated.

24. (currently amended) A processor-readable medium as recited in claim 16, wherein generating the actuator control signal comprises instructions for:

generating coefficients comprising:

$A0 = A0 + (DC0 * Ek * Mu)$;

$A1 = A1 + (QS1 * Ek * Mu)$;

$B1 = B1 + (QC1 * Ek * Mu)$;

$A2 = A2 + (QS2 * Ek * Mu)$; and

$B2 = B2 + (QC2 * Ek * Mu)$;

wherein Ek is the error term; ~~and~~ Mu is the adaptation coefficient; A0, A1, A2, B1, and B2 are the coefficients generated by the coefficient generator; QS1, QS2, QC1, and QS2 are sinusoidal or cosinusoidal terms; and, DC0 is a nominal voltage level; and

calculating a Fourier series to generate the actuator control signal using the coefficients generated.

25. (currently amended) A processor-readable medium as recited in claim 16, wherein generating the actuator control signal comprises instructions for calculating the actuator control signal according to Wk(new) = Wk(old) – (Mu * Ek), wherein Wk is the actuator control signal, Ek is the error term, and Mu is the adaptation coefficient.

26. (original) A processor-readable medium as recited in claim 25, wherein generating the actuator control signal comprises instructions for, if an angular disk speed of the optical disk drive is sufficiently high, shifting a phase of terms within the actuator control signal to compensate for actuator harmonics.

27. (original) A processor-readable medium as recited in claim 16, comprising instructions for creating a baseline signal.

28. (original) A processor-readable medium as recited in claim 16, wherein creating the baseline signal to initially position an actuator comprises instructions for:

step an actuator through a full range of focus;

record a maximum value of the SUM signal data obtained within the full range of focus; and

set the baseline signal according to an input to the actuator which resulted in close to the maximum value of the SUM signal data.

29. (currently amended) A method of focusing optics on a disk within an optical disk drive, comprising:

writing data to a SUM table, wherein the data is grouped according to disk sector, the data written to the SUM table representing a summation of values from a plurality of focus sensors, and is different than a focus error signal (FES) representing a difference between a sum of the values from a first subset of the focus sensors and a sum of the values from a second subset of the focus sensors;

generating an error term using data from the SUM table; and

generating an actuator control signal using the error term and an adaptation coefficient configured to impact a rate at which the actuator control signal varies.

30. (original) The method of claim 29, additionally comprising updating the SUM table with data from the SUM signal prior to application of an image to an annular portion of a label surface of the disk.

31. (original) The method of claim 29, additionally comprising:

obtaining and writing data to the SUM table while moving an actuator in a first direction from a baseline position through a portion of each sector of the disk during a first revolution; and

obtaining and writing data to the SUM table while moving the actuator in a second direction from the baseline position through a portion of each sector of the disk during a second revolution.

32. (original) The method of claim 29 wherein generating the error term comprises generating an error term for each sector of the disk by calculating a difference between data from the SUM table associated with focusing optics being moved closer to the disk and data from the SUM table associated with the focusing optics being moved further from the disk.

33. (original) The method of claim 29, wherein generating the actuator control signal comprises:

generating coefficients as a function of inputs comprising the adaptation coefficient and the error term; and

calculating a Fourier series to generate the actuator control signal using the coefficients generated.

34. (original) The method of claim 29, wherein generating the actuator control signal comprises:

generating coefficients comprising:

A0 = A0 + (DC0 * Ek * Mu);

A1 = A1 + (QS1 * Ek * Mu);

B1 = B1 + (QC1 * Ek * Mu);

A2 = A2 + (QS2 * Ek * Mu); and

B2 = B2 + (QC2 * Ek * Mu);

wherein Ek is the error term and Mu is the adaptation coefficient; and

calculating a Fourier series to generate the actuator control signal using the coefficients generated.

35. (original) The method of claim 29, additional comprising creating a baseline signal for initial use as the actuator control signal.

36. (original) The method of claim 35, wherein creating the baseline signal to initially position an actuator comprises:

stepping an actuator through a full range of focus;

recording a maximum value of the SUM signal data obtained within the full range of focus; and

setting the baseline signal according to an input to the actuator which resulted in close to the maximum value of the SUM signal data.

37. (original) The method of claim 29, wherein generating the actuator control signal comprises calculating the actuator control signal according to Wk(new) = Wk(old) – (Mu * Ek), wherein Ek is the error term and Mu is the adaptation coefficient.

38. (original) The method of claim 37, wherein generating the actuator control signal additionally comprising, if an angular disk speed of the optical disk drive is sufficiently high, shifting a phase of terms within the actuator control signal to compensate for actuator harmonics.

39. (currently amended) A focusing system, comprising:

means for writing data to a SUM table, wherein the data is grouped according to disk sector, the data written to the SUM table representing a summation of values from a plurality of focus sensors, and is different than a focus error signal (FES) representing a difference between a sum of the values from a first subset of the focus sensors and a sum of the values from a second subset of the focus sensors;

means for generating an error term using data from the SUM table; and

means for generating an actuator control signal using the error term and an adaptation coefficient used to impact a rate at which the actuator control signal varies.

40. (original) The focusing system of claim 39, additionally comprising means for updating the SUM table prior between applications of an image to annular portions of the disk

41. (original) The focusing system of claim 39, additionally comprising:

means for obtaining and writing data to the SUM table while moving an actuator in a first direction from a baseline position through a portion of each sector of the disk during a first revolution; and

means for obtaining and writing data to the SUM table while moving the actuator in a second direction from the baseline position through a portion of each sector of the disk during a second revolution.

42. (original) The focusing system of claim 39, wherein the means for generating the error term comprises means for generating an error term for each sector of the disk by calculating a difference between data from the SUM table associated with focusing optics being moved closer to the disk and data from the SUM table associated with the focusing optics being moved further from the disk.

43. (original) The focusing system of claim 39, additionally comprising means for updating the SUM table prior to application of an image to an annular portion of the disk.

44. (original) The focusing system of claim 39, wherein the means for generating the actuator control signal comprises:

means for generating coefficients as a function of inputs comprising the adaptation coefficient and the error term; and

means for calculating a Fourier series to generate the actuator control signal using the coefficients generated.

45. (original) The focusing system of claim 39, wherein the means for generating the actuator control signal comprises:

means for generating coefficients comprising:

$A0 = A0 + (DC0 * Ek * Mu)$;

$A1 = A1 + (QS1 * Ek * Mu)$;

$B1 = B1 + (QC1 * Ek * Mu)$;

$A2 = A2 + (QS2 * Ek * Mu)$; and

$B2 = B2 + (QC2 * Ek * Mu)$;

wherein Ek is the error term and Mu is the adaptation coefficient; and

means for calculating a Fourier series to generate the actuator control signal using the coefficients generated.

46. (currently amended) The focusing system of claim 39, wherein the means for generating the actuator control signal comprises means for calculating the actuator control signal according to $Wk(new) = Wk(old) - (Mu * Ek)$, wherein Ek is the error term and Mu is the adaptation coefficient.~~; and~~

47. (original) The focusing system of claim 46, wherein the means for generating the actuator control signal additionally comprises, if an angular disk speed of the optical disk drive is sufficiently high, means for shifting a phase of terms within the actuator control signal to compensate for actuator harmonics.

48. (original) The focusing system of claim 39, additional comprising means for creating a baseline signal, wherein the baseline signal is different in different sectors of the disk.

49. (original) The focusing system of claim 39, wherein creating the baseline signal to initially position an actuator comprises:

means for stepping the actuator through a full range of focus;

means for recording a maximum value of the SUM signal data obtained within the full range of focus; and

means for setting the baseline signal according to an input to the actuator which resulted in close to the maximum value of the SUM signal data.